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TITLE: Lockheed Martin Energy Systems Chronic Beryllium Disease Prevention Program

I. PURPOSE

This program description defines the actions and responsibilities necessary to effectively manage beryllium and beryllium compounds, reduce the number of workers exposed, minimize the levels of beryllium exposure and the potential for exposure to beryllium, and establish medical surveillance protocols to ensure early detection of disease. This program description replaces Y70-201, *Plant Beryllium Protection Program*.

II. SCOPE

This program description applies to the processing and storage of beryllium and beryllium compounds at Energy Systems facilities, including requirements for beryllium hazard analyses, beryllium work plans (BWPs), beryllium activity areas, beryllium storage areas, beryllium areas, regulated beryllium areas, management of beryllium contaminated items outside beryllium and regulated beryllium areas, transfer of items and parts, worker training, and medical surveillance.

These actions and responsibilities are based on the requirements of the Department of Energy (DOE) Notice 440.1, *Interim Chronic Beryllium Disease Prevention Program.*

This program description applies to Energy Systems and Energy Systems' subcontractors to the extent that such requirements are incorporated into contract documents. These requirements do not apply to the Energy Systems construction manager except as communicated through contract SE-CM001C and applicable divisions of the engineering technical specifications.

The requirements of this program do not apply to commercially procured products that the beryllium program manager has evaluated as not posing an exposure hazard.

Exemptions from this procedure shall be approved by the Energy Systems Safety and Health Director and the Vice President, Defense and Manufacturing.

Implementation of this program will be accomplished through facility characterizations, realignment of area boundaries, development of associated hazard analyses and BWPs, and personnel training. Implementation oversight is the responsibility of the CBDPP Committee. The effective date for implementation of this program in areas where active work is being conducted is September 30, 1998. The effective date for implementation of this program in legacy areas is September 30, 1999.

III. ESTABLISHING AND MAINTAINING BERYLLIUM CHARACTERIZATION OF Y-12 FACILITIES

A. Beryllium Program Manager

1. In conjunction with line management, establish a baseline characterization of beryllium activity, beryllium storage, beryllium, and regulated beryllium areas including current and legacy sites.

III. ESTABLISHING AND MAINTAINING BERYLLIUM CHARACTERIZATION OF Y-12 FACILITIES (cont.)

A. Beryllium Program Manager (cont.)

2. Maintain a computerized drawing data base which identifies the location of all beryllium activity, beryllium storage, beryllium, regulated beryllium areas and legacy areas.

3. Maintain characterization documentation for each facility where beryllium is or has been stored or processed.

4. Validate the computerized drawings as part of the annual program assessment.

5. Approve or disapprove area additions or deletions requested by the appropriate operations manager (or equivalent) and forward the request to the cognizant organization manager for final approval.

6. If the request is approved by the organization manager, update the computerized drawing data base and characterization records to reflect the change.

B. Line Management

1. To add or delete areas in a facility, the operations manager (or equivalent) in conjunction with safety and health personnel, will conduct appropriate characterization surveys and forward the survey reports, along with justification for adding or deleting the area to the Beryllium Program Manager for review.

2. The Beryllium Program Manager will approve or disapprove the request and then forward the request to the cognizant organization manager.

3. The organization manager will approve or disapprove the request to add or delete an area.

4. If the Beryllium Program Manager does not approve the request, the organization manager can take the request to the CBDPP Committee for resolution.

5. Once the organization manager has approved the area addition or deletion, the operations manager will execute the appropriate steps to properly post or depost the area.

6. In cases where high beryllium smear or airborne levels are detected, the area will be posted immediately. These areas will be decontaminated and down posted or approval to add these areas will be obtained as specified above.

IV. HAZARD ANALYSIS

The hazard analysis is used to identify, evaluate, and document potential health risks associated with beryllium operations and forms the basis for subsequent sampling strategy, engineering, administrative, and personal protective equipment requirements.

A. Hazard Analysis Request

Line Management

1. Prepare a Hazard Analysis Request (see Appendix A) for all beryllium processing, handling, and activities where potential beryllium contamination exists.

   NOTE: A hazard analysis is not required for a beryllium activity area or a beryllium storage area.

2. Submit Hazard Analysis Request to Defense Programs Field Safety and Health Operations.

B. Hazard Analysis of Beryllium Tasks

Defense Programs Field Safety and Health Operations

1. Complete hazard analysis.

2. Incorporate into the hazard analysis existing conditions, exposure data, medical surveillance trends (e.g. incidence of chronic beryllium disease and sensitization), and the exposure potential of planned activities.

3. Submit hazard analysis to the operational safety board.

   NOTE: In facilities without operational safety boards, the line management responsible for the work to be done will establish a multi-disciplinary team to perform the functions of the operational safety board. The team will be led by line management and will include, at a minimum, a task worker and a representative from the Safety and Health Organization.

V. BERYLLIUM WORK PLAN (BWP)

A. Beryllium Work Plan Preparation

Operational Safety Board

1. Complete BWP (see Appendix B). Attach a supplemental sheet (Appendix C) when additional space is required to complete an item.

V. BERYLLIUM WORK PLAN (BWP) (cont.)

A. Beryllium Work Plan Preparation (cont.)

Operational Safety Board (cont.)

a. Ensure hazard analysis and other technical work documents and permits (Operational Safety Work Permit, Radiation Work Permit, etc.) are evaluated during the preparation of the BWP.

b. Assign a BWP number and cross-reference it to the hazard analysis number.

c. Provide effective date, expiration date, location, description of work, pre-work and anticipated work conditions (e.g. historical sampling results, potential sources of exposure), and area designation.

NOTE: A BWP may remain in effect for up to one year.

NOTE: A BWP is not required for a beryllium activity area or a beryllium storage area.

d. Identify required sampling.

(1) Types of Sampling

- Personal Air Monitoring

  Personal air monitoring is conducted to determine worker exposure levels.

  Personal air monitoring requirements will be specified as 8 hour time-weighted average (TWA), ceiling, or 30-minute peak samples.

  Monitoring will be conducted in accordance with Energy Systems Y-12 Defense Programs Safety and Health Field Operation Department (DPS&HFOD) Training Program Manual, Training Management System (TMS) Module 16310.

- Area Air Monitoring

  Area air monitoring will be used to characterize the source of beryllium exposure, check the effectiveness of beryllium control systems, make an initial determination of the level of respiratory protection needed, and confirm acceptable beryllium concentrations in general work areas.

  Monitoring will be conducted in accordance with Energy Systems Y-12 DPS&HFOD Training Program Manual, TMS Module 16310.

V. BERYLLIUM WORK PLAN (BWP) (cont.)

A. Beryllium Work Plan Preparation (cont.)

Operational Safety Board (cont.)

- Surface Monitoring

  Surface monitoring is used to monitor the effectiveness of housekeeping efforts, identify legacy contamination, and determine the sources of beryllium contamination. It is not a measure of personal exposure.

  Monitoring will be conducted in accordance with Energy Systems Y-12 DPS&HFOD Training Program Manual, TMS Module 15949.

(2) Initially, personal air monitoring will be conducted for each worker involved in a beryllium task every time the worker enters the beryllium or regulated beryllium area. When sufficient data has been collected to characterize the worker's exposure potential, the sampling frequency may be reduced by revising the BWP. However, at least one worker involved in the task will continue to be monitored.

(3) Frequency and Number of Samples for Each Sampling Type

- The frequency (daily, weekly, monthly, quarterly) and number of samples for each type of sampling will be determined in accordance with available technical basis documents, historical data, and reduction and minimization goals. The frequency and number of samples will be listed on the BWP.

e. Identify training requirements for entry (see Section XII).

f. For beryllium regulated areas, identify individuals authorized to enter area under the BWP.

g. Establish other facility requirements.

h. Identify controls.

It is prudent to control exposures at Energy Systems installations to as low as practical using strategies of exposure reduction and minimization. The mechanisms for maintaining exposures as low as practical are engineering controls, administrative controls, and personal protective equipment. The objectives of exposure control are minimization of airborne concentrations, the potential for and spread of contamination, and the number of exposed and potentially exposed employees.

i. Establish special instructions, including those to ensure beryllium controls are integrated with controls for other hazards present.

V. BERYLLIUM WORK PLAN (BWP) (cont.)

B. Beryllium Work Plan Implementation

Operations Manager or Designated Line Manager

1. Approve BWP.

Line Management

2. Ensure that a BWP and Beryllium Work Plan Sign In Sheet (see Appendix D) exist for each beryllium task and are available at the beryllium or regulated beryllium area. For regulated beryllium areas, the BWP will list personnel authorized to enter.

All individuals

3. Read and sign in on effective BWP before each entry to the work area.

4. Sign out after each exit.

   NOTE: This does not apply to tasks requiring multiple entries and exits (e.g. moving several drums or containers) where the worker stays in the immediate vicinity.

   NOTE: After exiting it is good practice to wash hands thoroughly before eating, smoking, or drinking.

Defense Programs Field Safety and Health Operations

5. Collect sign in/sign out information monthly and review for completeness.

6. Provide BWP and sign in/sign out information to Safety and Health Program Development and Information Management Department, Systems Information Group.

7. Document and notify line management of issues and nonconformances associated with sign in/sign out information.

C. Beryllium Work Plan Status Changes

Operational Safety Board

1. Recommend revising BWP when any of the following occur:

   a. Conditions change so that a change in BWP requirements is warranted.

   b. Scope of work changes.

   c. Sampling results allow for changes in sampling frequency, controls, or personal protective equipment requirements.

V. BERYLLIUM WORK PLAN (BWP) (cont.)

C. Beryllium Work Plan Status Changes (cont.)

Operational Safety Board (cont.)

2. Recommend terminating BWP as needed

   a. Ensure that no one is signed in on BWP.

   b. Remove all posted copies of BWP and sign in sheets.

VI. REQUIREMENTS FOR BERYLLIUM ACTIVITY AREAS

Areas within facilities that encompass beryllium storage areas, beryllium areas, or regulated beryllium areas shall be designated beryllium activity areas. Beryllium activity areas are established to alert personnel that the area is restricted because it has active beryllium processes confined within designated beryllium areas or regulated beryllium areas.

A. Personal Protection

Eating, Drinking, Smoking: There shall be no eating, drinking, smoking, chewing of gum or tobacco, application of cosmetics, taking of medication, or storage of food in beryllium activity areas.

B. Operational Requirements

1. Area Identification: Beryllium activity areas shall be delineated by postings (see Section XI) at locations determined by safety and health personnel in conjunction with line management responsible for the facility.

2. Access Control: Beryllium activity areas shall be entered only by authorized employees that have attended beryllium awareness training or are escorted by authorized personnel. Visitors shall be escorted by authorized personnel while in beryllium activity areas. Unauthorized personnel and employees sensitive to beryllium or those having Chronic Beryllium Disease or other chronic lung diseases are restricted from entering beryllium activity areas.

3. Transport: Clean containers containing beryllium or beryllium compounds may be moved through beryllium activity areas.

4. Emergency Plan: An emergency plan prepared in accordance with EM-127, *Oak Ridge Reservation Building/Facility Emergency Program*, that covers responsibilities of employees in case of a spill, breakage or uncontrolled event shall be maintained.

5. Down Posting: Beryllium activity areas may be down posted as appropriate.

VI. REQUIREMENTS FOR BERYLLIUM ACTIVITY AREAS (cont.)

C. Transfers

Weapon components containing or contaminated with beryllium or beryllium compounds shall be in containers with less than 5 ug/100cm^2 surface contamination on the outside of the container or the container placed in a clean poly bag before being transferred through a beryllium activity area.

D. Site Administrative Action Level

1. Decontamination: The site administrative action level for surface contamination in a beryllium activity area is 5 ug/100cm^2.

   Any beryllium activity area where surface contamination is found above this level shall be posted as a regulated beryllium area and cleaned until below 5 ug/100cm$^{2.}$

VII. REQUIREMENT FOR BERYLLIUM STORAGE AREAS

A beryllium storage area is defined as an area where beryllium or beryllium compounds are stored, surface contamination levels are maintained less than 5 ug/100cm^2, and personal air sampling results are less than 0.5 ug/m^3. See Chronic Beryllium Disease Prevention Program, SH-201PD, Exempted Activities, Y/SM-13 for exceptions.

A. Personal Protection

Eating, Drinking, Smoking: There shall be no eating, drinking, smoking, chewing of gum or tobacco, application of cosmetics, taking of medication, or storage of food in beryllium storage areas.

B. Operational Requirements

1. Operational Control: A beryllium storage area is for storage only. Containers cannot be opened in a beryllium storage area.

2. Area Identification: Beryllium storage areas shall be delineated by postings (see section XI) at locations determined by safety and health personnel in conjunction with line management responsible for the facility.

3. Access Control: Beryllium storage areas shall be entered only by authorized employees that have attended beryllium awareness training or are escorted by authorized personnel. Visitors shall be escorted by authorized personnel while in beryllium storage areas. Unauthorized personnel and employees sensitive to beryllium or those having Chronic Beryllium Disease or other chronic lung diseases are restricted from entering beryllium storage areas.

4. Transport: Clean containers containing beryllium or beryllium compounds may be moved through or stored in beryllium storage areas.

VII. REQUIREMENT FOR BERYLLIUM STORAGE AREAS (cont.)

B. Operational Requirements (cont.)

5. Emergency Plan: An emergency plan prepared in accordance with EM-127, *Oak Ridge Reservation Building/Facility Emergency Program*, that covers responsibilities of employees in case of a spill, breakage, or uncontrolled event shall be maintained.

6. Down Postings: Beryllium storage areas may be down posted when beryllium storage is no longer required.

C. Transfers

Weapon components containing or contaminated with beryllium or beryllium compounds shall be in containers with less than 5 ug/100cm^2 surface contamination on the outside of the container or the container placed in a clean poly bag before being transferred through or stored in a beryllium storage area.

D. Site Administrative Action Level

1. Decontamination: The site administration action level for surface contamination in a beryllium storage area is 5 ug/100cm^2.

   Any beryllium storage area where surface contamination is found above this level shall be posted as a regulated beryllium area and cleaned until below 5 ug/100cm^2.

VIII. REQUIREMENTS FOR BERYLLIUM AREAS

A beryllium area is defined as an area where beryllium or beryllium compounds are being processed or stored incidental to the process, surface contamination levels are maintained less than 5 ug/100 cm^2, and personal air sampling results are less than 0.5 ug/m^3. See Chronic Beryllium Disease Prevention Program, SH-201PD, *Exempted Activities, Y/SM-13 for exceptions*.

A. Personal Protection

1. Eating, Drinking, Smoking: There shall be no eating, drinking, smoking, chewing of gum or tobacco, application of cosmetics, taking of medication, or storage of food in beryllium areas.

2. Hand Cleaning: When required by the BWP, hands shall be cleaned at a posted sink or by using wet cleansing wipes before leaving the area.

B. Operational Requirements

1. Area Identification: Beryllium areas shall be delineated by postings and a two inch strip of blue tape, paint or flagging along the perimeter, or by structural barriers such as walls. (See Section XI).

VIII. REQUIREMENTS FOR BERYLLIUM AREAS (cont.)

B. Operational Requirements (cont.)

2. Access Control: Beryllium areas shall be entered only with approval of line management. All persons shall sign in under a BWP. Properly qualified visitors shall be escorted by authorized personnel while in beryllium areas. Employees sensitive to beryllium or those having Chronic Beryllium Disease or other chronic lung disease are restricted from entering beryllium areas.

3. Initial Personal Air Monitoring Requirements: Initially, personal air monitoring will be conducted for each worker involved in a beryllium task every time the worker enters a beryllium area. When sufficient data has been collected to characterize the exposure potential to the worker, the sampling frequency may be reduced by revising the BWP. However, at least one worker involved in the task will continue to be monitored.

4. Work Surfaces: Work surfaces (bench tops, floors, etc.) on which beryllium or beryllium compounds are used or stored, unless they are of a disposable nature, shall be nonporous and easily decontaminated. Nondisposable work surfaces, when contamination is probable, will be smear sampled and cleaned, if necessary, in accordance with the BWP and posted as required.

5. Weapon Components: Where sufficient data is available to ensure personal exposures are less than $0.5ug/m^3$, weapon components with surface contamination levels less than $25ug/100cm^2$ may be handled in a beryllium area. No dust producing activities (e.g., machining or cutting) will be conducted and work surfaces shall remain less than $5ug/100cm^2$. Appropriate controls will be specified in the BWP.

6. Storage and Identification: Beryllium and beryllium compounds should be segregated from other chemicals when feasible. The storage container shall be approved for beryllium storage and labeled appropriately (see Section XI) as specified in the BWP.

7. Transport: Movements over short distances within the work area may not require containerization and shall be controlled by the requirements in the BWP. Movement between facilities will be in approved containers.

8. Housekeeping: General housekeeping methods which suppress the formation of aerosols, such as the use of a wet mop or a vacuum cleaner equipped with a HEPA filter, shall be used. Dry sweeping and dry mopping are prohibited.

9. Emergency Plan: An emergency plan prepared in accordance with EM-127, *Oak Ridge Reservation Building/Facility Emergency Program*, that covers responsibilities of employees in case of a spill, breakage or uncontrolled event shall be maintained.

10. Down Posting: Beryllium areas may be down posted when beryllium activities or storage are no longer required in the area. Down posting requirements, such as decontamination and sampling, will be specified in the applicable BWP.

VIII. REQUIREMENTS FOR BERYLLIUM AREAS (cont.)

C. Facility Requirements

1. Hand-Washing Facility: When hand cleaning is required by the BWP, either a hand-washing facility or wet cleaning wipes shall be available within the area.

2. Ventilation:

   a. Exhaust air from primary containment such as glove boxes or hoods shall be HEPA filtered and discharged to the outdoors, or other controls (i.e., engineering, administrative, or personal protective equipment) to ensure worker safety shall be required on the BWP.

   b. If airborne beryllium is detected, exhaust ventilation systems shall maintain an inflow of air from outside the work area or other controls (i.e., engineering, administrative, or personal protective equipment) to ensure the safety of workers outside the area shall be required on the BWP.

D. Transfers

1. Weapon components containing or contaminated with beryllium or beryllium compounds shall be in containers with less than 5 ug/100cm^2 surface contamination on the outside of the container or be in clean poly bags before being transferred through nonberyllium areas.

   NOTE: Where feasible, components should be placed in plastic bags prior to being placed in containers.

2. Labels as noted in Section XI shall be applied to the containers. When transferring components between facilities, a Request for Transfer (see Appendix E) shall be used.

   NOTE: When these labeling requirements cannot be met due to the nature of the processing involved, other controls that meet the intent of these requirements shall be implemented in the BWP.

E. Site Administrative Action Level

Decontamination: The site administrative action level for surface contamination in a beryllium area is 5 ug/100 cm^2.

Work surfaces at or above 5 ug/100 cm^2 shall be posted as a regulated beryllium area and cleaned until below 5 ug/100 cm^2.

IX. REQUIREMENTS FOR REGULATED BERYLLIUM AREAS

A regulated beryllium area is defined as an area where beryllium or beryllium compounds are used and surface contamination is equal to or greater than 5 ug/100 cm^2 or personal air sampling results are equal to or greater than 0.5 ug/m^3.

A. Personal Protection

1. Clothing: Company protective clothing, such as fully fastened laboratory coat, coveralls, or disposable tyvek or paper suits, shall be worn over normal work clothing as required by the BWP. Company protective clothing worn over normal work clothing shall be removed in the change area prior to exiting. Nondisposable company protective clothing (e.g., anti-Cs) shall be segregated into properly labeled containers and wetted prior to transfer to the laundry. Clean protective clothing shall be worn daily.

2. Shoe covers: Employees are required to wear shoe covers in regulated beryllium areas.

3. Eating, Drinking, Smoking: There shall be no eating, drinking, smoking, chewing of gum or tobacco, application of cosmetics, taking of medication, or storage of food in regulated beryllium areas.

4. Hand Cleaning: When gloves are not worn, hands shall be cleaned at a posted sink or by using wet cleansing wipes in accordance with the BWP before leaving the area.

B. Operational Requirements

1. Area Identification: Regulated areas shall be delineated by postings and a two inch strip of blue tape, paint or flagging along the perimeter or by structural barriers such as walls (see Section XI).

2. Access Control: Areas shall be entered only by persons authorized by line management. Authorized personnel shall be listed on the BWP. All persons shall sign in under a BWP. Properly qualified visitors shall be escorted by authorized personnel while in regulated beryllium areas. Employees sensitive to beryllium or those having Chronic Beryllium Disease or other chronic lung diseases are restricted from entering any beryllium activity areas.

3. Initial Personal Air Monitoring Requirements: Initially, personal air monitoring will be conducted for each worker involved in a beryllium task every time the worker enters a regulated beryllium area. When sufficient data has been collected to characterize the exposure potential to the worker, the sampling frequency may be reduced by revising the BWP. However, at least one worker involved in the task will continue to be monitored.

4. Work Surfaces: Work surfaces (bench tops, floors, etc.) on which beryllium or beryllium compounds are used or stored, unless they are of a disposable nature, shall be nonporous and easily decontaminated. Nondisposable work surfaces, when contamination is probable, will be smear sampled and cleaned, if necessary, in accordance with the BWP and posted as required.

IX. REQUIREMENTS FOR REGULATED BERYLLIUM AREAS (cont.)

B. Operational Requirements (cont.)

5. Storage and Identification: Beryllium and beryllium compounds should be segregated from other chemicals when feasible. The storage container shall be approved for beryllium storage and labeled appropriately (see Section XI) as specified in the BWP.

6. Transport: Movements over short distances within the work area may not require containerization and shall be controlled by the requirements in the BWP. Movement between facilities will be in approved containers as specified in the BWP.

7. Housekeeping: General housekeeping methods which suppress the formation of aerosols, such as the use of a wet mop or a vacuum cleaner equipped with a HEPA filter, shall be used. Dry sweeping and dry mopping are prohibited.

8. Emergency Plan: An emergency plan prepared in accordance with EM-127, *Oak Ridge Reservation Building/Facility Emergency Program*, that covers responsibilities of employees in case of a spill, breakage or uncontrolled event shall be maintained.

9. Down Posting: Beryllium regulated areas may be down posted when appropriate. Down posting requirements, such as decontamination and sampling will be specified in the applicable BWP.

C. Facility Requirements

1. Change Areas: Change areas shall be available for workers to don and doff the appropriate personal protective equipment. Protective equipment required to enter the area should be available to personnel at the change area. Approved receptacles for disposal of personal protective equipment should be in the exiting area.

2. Hand-Washing Facility: When hand cleaning is required by the BWP either a hand-washing facility or wet cleaning wipes shall be available within the area.

3. Ventilation:

   a. Exhaust air from primary containment such as glove boxes or hoods shall be HEPA filtered and discharged to the outdoors or other controls (i.e., engineering, administrative, or personal protective equipment) to ensure worker safety shall be noted on the BWP.

   b. If airborne beryllium is detected, exhaust ventilation systems shall maintain an inflow of air from outside the work area or other controls (i.e., engineering, administrative, or personal protective equipment) to ensure the safety of workers outside the area shall be noted on the BWP.

4. Change House: When the hazard analysis indicates that the potential for exceeding the OELs exists and cannot be controlled, a change house shall be required in the BWP.

IX. REQUIREMENTS FOR REGULATED BERYLLIUM AREAS (cont.)

D. Transfers

1. Items shall be sampled and determined to have less than 5 ug/100 cm^2 surface contamination or be in containers with less than 5 ug/100 cm^2 surface contamination before being removed from a regulated beryllium area.

   Labeling shall be done in accordance with Section XI. A Request for Transfer (see Appendix E) shall be used for transfers through nonberyllium areas.

2. Weapon components containing or contaminated with beryllium or beryllium compounds shall be in containers with less than 5 ug/100 cm^2 external surface contamination or the containers put in clean poly bags before being transferred through beryllium and nonberyllium areas.

   NOTE: When feasible, components should be placed in plastic bags before being placed in containers.

3. Labels as noted in Section XI shall be applied to the containers. When transferring components between facilities, a Request for Transfer (see Appendix E) shall be used.

   NOTE: When these labeling requirements cannot be met due to the nature of the processing involved, other controls to ensure worker safety shall be noted on the BWP.

4. Components shall be cleaned to surface levels less than 25ug/100cm^2 when:

   a. Processing (e.g., machining) may generate removable surface contamination, and

   b. The operation receiving the part does not have measures in place to control airborne beryllium.

E. Site Administrative Action Level

1. Use of Respirators: The site administrative action level for an 8-hour TWA personal air sample is 0.5 ug/m^3.

   Respiratory protection will be worn in accordance with SH-151PD, *Respiratory Protection Program*, when airborne levels are equal to or greater than 0.5 ug/m^3, or as required by the BWP.

2. Decontamination: The site administrative action level for surface contamination is 25 ug/100 cm^2 in a regulated beryllium area.

   Work surfaces, outside primary containment such as glove boxes or hoods, at or above 25 ug/100 cm^2 shall be cleaned or special controls that meet the intent of this requirement shall be required in the BWP.

X. MANAGEMENT OF BERYLLIUM CONTAMINATED ITEMS OUTSIDE A BERYLLIUM OR REGULATED BERYLLIUM AREA

A. Assessment

Line Management

1. Identify items known to have been used or suspected of having been used in historical beryllium operation.

Defense Programs Field Safety and Health Operations

2. Smear external surfaces of identified equipment and provide results to line management.

B. Controls

Line Management

1. Ensure a regulated area is established around items with external contamination greater than or equal to 5 ug/100 cm^2.

2. Label items with external contamination less than 5 ug/100 cm^2 as having possible internal beryllium contamination (see Section XI).

    a. Labels shall be conspicuously applied as close as practical to locations where access into process lines and ventilation ducts will most likely be made (access ports, flanges, valves, etc.).

    b. For process piping and ventilation ducts, labels shall be placed at intervals of less than 20 feet on all accessible sides.

3. Maintain configuration control on identified items in Section X B.2.

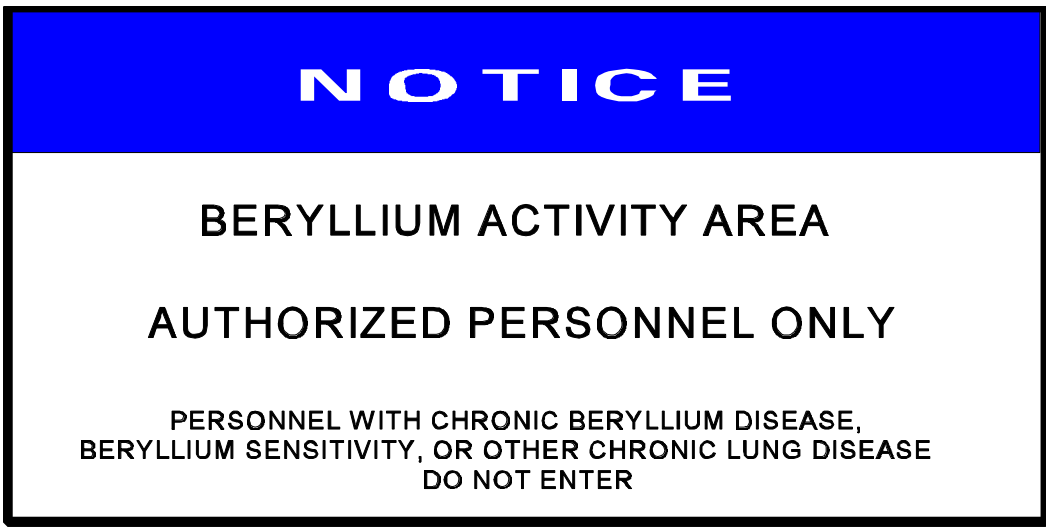
4. Ensure all work on identified items from Section X B.2 is performed in accordance with a BWP.

XI. POSTING OF SIGNS AND USE OF LABELS

A. Signs

1. Beryllium Activity Area: This sign title is **BERYLLIUM ACTIVITY AREA**.

   This sign is approximately 10 inches by 14 inches (10" x 14") with colors and lettering as specified below. Signs shall be made of durable material. Signs shall be posted at all entrances to beryllium activity areas.



"Notice" is white on a blue background. Text is black on a white background. The border is black.

XI. POSTING OF SIGNS AND USE OF LABELS (cont.)

A. Signs (cont.)

2. Beryllium Storage Area: The sign title is **BERYLLIUM STORAGE AREA**.

The sign is approximately 10 inches by 14 inches (10" X 14") with colors and lettering as specified below. Signs shall be made of durable material. Signs shall be posted at all entrances to beryllium storage areas.

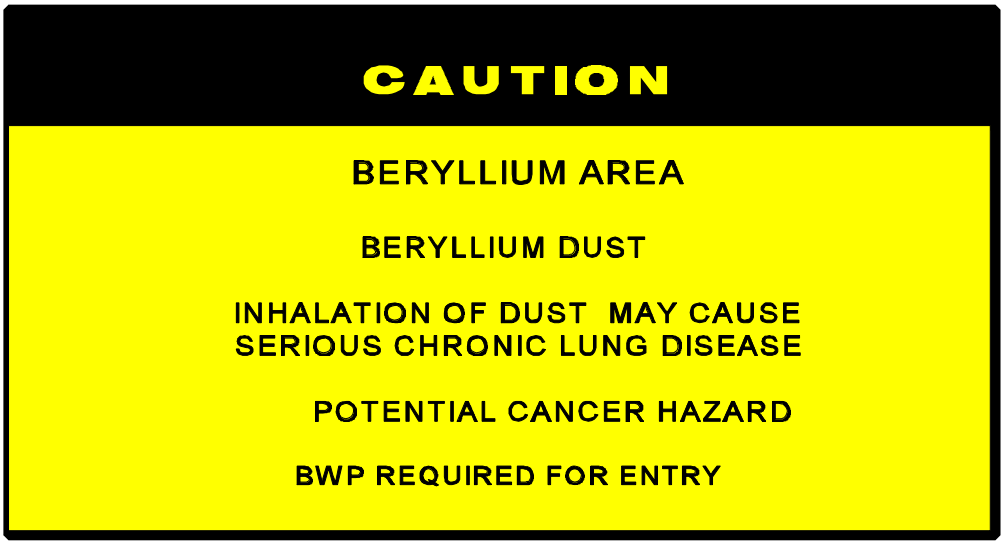
"Notice" is white on a blue background. Text is black on a white background. The border is black.

XI. POSTING OF SIGNS AND USE OF LABELS (Cont.)

A. Signs (cont.)

3. Beryllium Area: The sign title is **BERYLLIUM AREA**.

The sign is approximately 10 inches by 14 inches (10" X 14") with colors and lettering as specified below. Signs shall be made of durable material. Signs shall be posted at all entrances to Beryllium Areas.



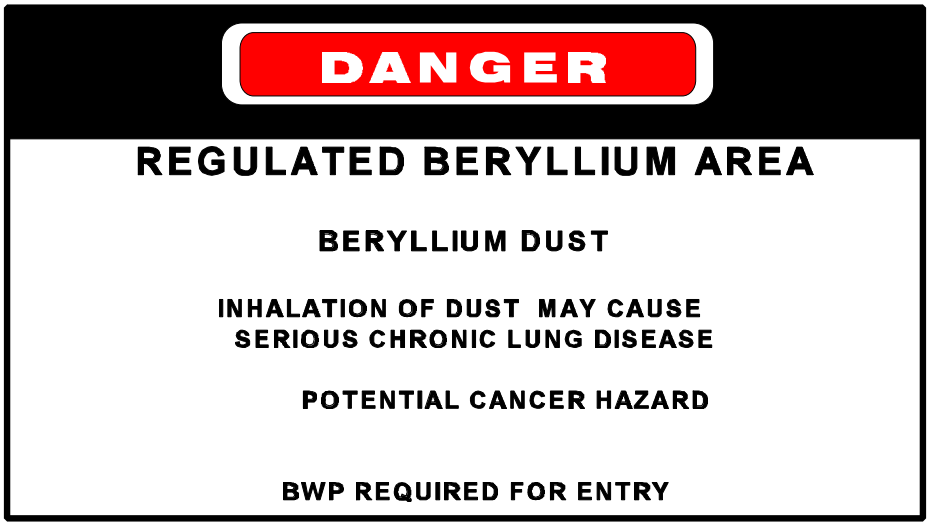
"Caution" is yellow on a black background. Text is black on a yellow background. The border is black.

XI. POSTING OF SIGNS AND USE OF LABELS (cont.)

A. Signs (cont.)

4. Regulated Beryllium Area: The sign title is **REGULATED BERYLLIUM AREA**.

   The sign is approximately 10 inches by 14 inches (10" X 14") with colors and lettering as specified below. Signs shall be posted at all entrances to regulated beryllium areas.



   "Danger" is in white letters on a red oval, which is imposed on a larger white oval on a black rectangle. The text is black on a white background. The border is black.

5. Posting of Prohibited Activities and Items in Beryllium Activity, Beryllium and Regulated Beryllium Areas

   The following statement is required to be posted with the beryllium activity, beryllium, and regulated beryllium area signs.

Eating, drinking, chewing gum or tobacco, and smoking are prohibited in this area.

   This statement is not required if existing area specific requirements prohibit these activities.

XI. POSTING OF SIGNS AND USE OF LABELS (cont.)

A. Signs (cont.)

6. Posting for sinks in beryllium and regulated beryllium areas.

Before posting the following signs at any beryllium or regulated beryllium area sinks, contact the environmental management department. A representative of this department shall inspect and evaluate the sink and designate the appropriate sign to use.

a. Sinks draining or pumped to a beryllium collection tank

Post the following sign next to the sink.

This sink is designated for mop water disposal and tool, part, and hand washing to remove beryllium contamination.

Use black letters on a white background.

b. Posting for sinks that drain to the sanitary sewer

Post the following sign.

This sink is designated for hand washing only

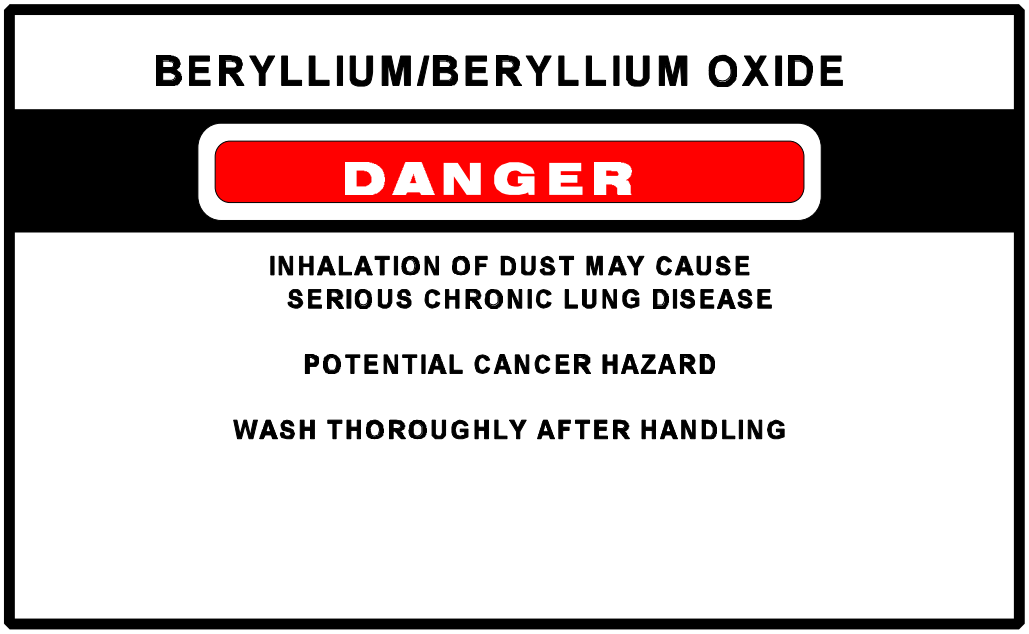
Use black letters on a white background.

XI. **POSTING OF SIGNS AND USE OF LABELS (cont.)**

B. Container Labels

1. Beryllium or Beryllium Oxide

Label size is commensurate with the size and shape of the container. Colors and lettering are specified below. Labels shall be placed on all containers including plastic bags of beryllium or beryllium oxide, beryllium contaminated clothing, respirators, waste, scrap, or debris.



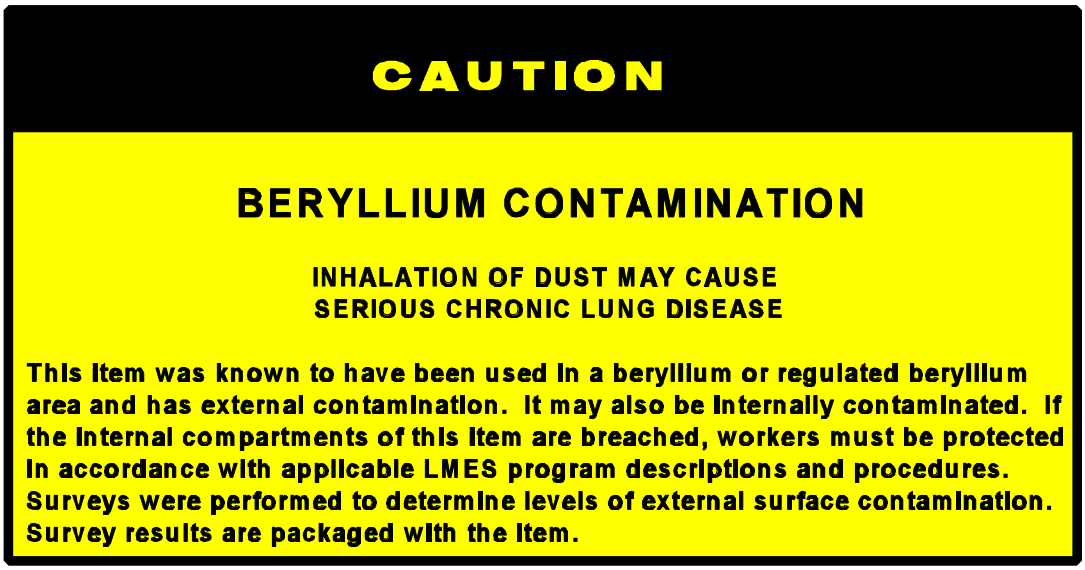
"Danger" is in white letters on a red oval, which is imposed on a larger white oval on a black rectangle. The text is black on a white background. The border is black.

XI. POSTING OF SIGNS AND USE OF LABELS (cont.)

C. Item Labeling

1. Beryllium Contamination Label

Label size shall be commensurate with the size and shape of the item. Colors and lettering are specified below. Labels shall be placed on all items having external beryllium contamination and a potential for internal beryllium contamination (does not include weapon components, contaminated clothing, waste, or debris) being transferred from a beryllium or regulated beryllium to another beryllium or regulated beryllium area.



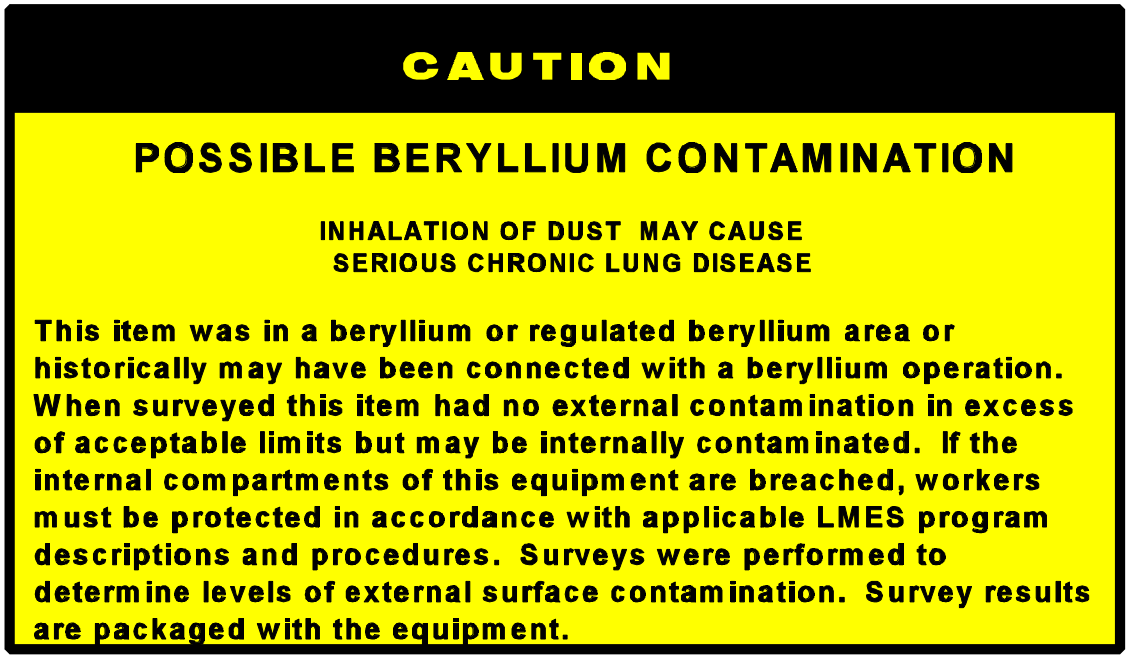
The word "Caution" is yellow on a black background. The text is black letters on a yellow background.

XI. POSTING OF SIGNS AND USE OF LABELS (cont.)

C. Item Labeling (cont.)

2. Label for Possible Beryllium Contamination

Label size shall be commensurate with the size and shape of the item. Colors and lettering are specified below. Labels shall be placed on all items having a potential for internal beryllium contamination (does not include weapon components, contaminated clothing, waste, or debris) being transferred from a beryllium or regulated beryllium area to a nonberyllium area.



The word "Caution" is yellow on a black background. The text is black letters on a yellow background.

XII. TRAINING

A. Beryllium Training

1. Awareness training is required of all nonberyllium workers every two years.

2. General training is required of all beryllium workers every two years.

3. Procedure training is required of all beryllium workers every two years.

4. Area specific training is required for all active beryllium workers upon initial assignment to an area and at a frequency not to exceed two years.

   Training will be conducted by line management, with the assistance of safety and health professionals, and will cover the elements listed below. Active beryllium workers must be informed whenever changes to any of these elements occur.

   a. Facility locations of beryllium activity areas, beryllium storage areas, beryllium areas, and regulated beryllium areas

   b. Procedural changes

   c. Proper waste management practices

   d. Review of the completed BWP for the assigned task. This review should include:

      1. Hazard Analysis

      2. Material Safety Data Sheets

      3. Decontamination

      4. Emergency Plan and Response

      5. Purpose and Use of Personal Protective Equipment

      6. Minimization of Worker Exposure

      7. Waste Management

      8. Release and Exposure Potential

      9. Work Practices

5. Required training will be developed, conducted, and revised by the *Conduct of Training Procedure*, Y10-027, and results maintained in TMS.

6. Visitors entering beryllium activity, beryllium storage, beryllium, and regulated beryllium areas shall read the Visitor Information Sheet (see Appendix F) prior to entry.

   Visitors entering beryllium or regulated beryllium areas shall also complete general beryllium training and be in a beryllium medical surveillance program prior to entry.

XIII. GOALS AND ASSESSMENTS

A. Annual Program Assessment:

Line management shall establish annual beryllium task-based goals for exposure reduction and minimization. These goals shall result from the annual assessment of the program conducted for and provided to line management by the Beryllium Program Manager. The operational safety board will review the annual program assessment and provide additional recommendations for consideration. The appropriate line manager will review and approve the report and the next year's goals. The results of the annual assessment and subsequent goals will be made available to appropriate supervisors, workers, planners, medical staff, and safety and health staff. The checklist used to conduct the annual assessment and develop goals is provided in Appendix G.

B. Semiannual Report:

The Beryllium Program Manager will compile and provide to line management a semiannual report assessing progress in meeting exposure reduction and minimization goals. The report will evaluate inconsistencies and make recommendations for improving performance. The operational safety board will review this report and provide additional recommendations for consideration by line management. The appropriate line manager will review and approve the report and initiate action to implement recommendations. The checklist for conducting the semiannual report is provided in Appendix H.

XIV. RESPONSIBILITIES

A. Energy Systems Safety and Health Program Development and Data Management

1. Program Manager

   a. Develop, maintain, and interpret the requirements for the CBDPP.

   b. Serve as liaison between the installation, Lockheed Martin Corporation, and DOE on company-wide matters relating to beryllium or beryllium compounds.

   c. Perform semiannual and annual program assessment in accordance with Section XIII and Appendices G and H.

   d. Maintain current beryllium characterization and computer drawing database of beryllium locations and operations. (See Section III)

2. Systems Information Management

   a. Maintain, in a readily retrievable manner, electronic copies of beryllium characterization information, hazard analyses, exposure measurements, sampling data, controls, BWPs, Beryllium Work Plan Sign-in Sheets, and all reports generated as a result of the CBDPP.

   b. Provide personal sampling reports to Defense Programs Field Safety and Health Operations staff.

   c. Provide monthly reports by location on area sampling, smear sampling, and permanent air sampling to Defense Programs Field Safety and Health Operations staff.

XIV. RESPONSIBILITIES (cont.)

A. Energy Systems Safety and Health Program Development and Data Management (cont.)

2. Systems Information Management (cont.)

   d. Provide to Occupational Medicine Services and Defense Programs Field Safety and Health Operations staff a monthly report on all beryllium personal air monitoring.

   e. Conduct semiannual correlation and trending of working conditions (controls, personal protective equipment, area designation, etc.) and health outcomes (cases of sensitivity and CBD).

   f. Conduct semiannual trending reports on task exposure group personal monitoring, area samples, permanent air samples, and smear samples.

   g. Provide Defense Programs Field Safety and Health Operations, Occupational Medicine Services, and the Beryllium Program Manager with copies of all semiannual reports.

3. Industrial Safety Reporting and Case Management

   a. Provide copies of investigation reports of recordable beryllium disease (see DOE Order 231.1) to DOE Y-12 Site Office.

   b. Ensure reports include workers occupational histories and clinical stages of the disease, as obtained from Occupational Medicine Services.

B. Energy Systems Defense Programs Field Safety and Health Operations

1. Assist line management in characterizing beryllium locations and operations, identifying operations and areas in which workers shall be monitored, and identifying exposed and potentially exposed current workers by location. This should include a records review and employee interviews.

2. Conduct a hazard analysis for all identified beryllium locations and operations (at the task level).

3. Include in the beryllium hazard analysis an evaluation of existing conditions (e.g. ventilation, traffic patterns, access control, beryllium sources, work practices), exposure data, medical surveillance trends, and the exposure potential of planned activities.

4. Conduct personal sampling for all workers exposed and potentially exposed to beryllium or provide the rationale for monitoring a limited subset of workers.

5. Provide personal sampling reports to employee's supervisor.

6. Inform line management immediately of personal samples exceeding the administrative action level and provide investigation results.

7. Conduct area sampling, where appropriate, to determine operational controls.

XIV. RESPONSIBILITIES (cont.)

B. Energy Systems Defense Programs Field Safety and Health Operations (cont.)

8. Conduct surface sampling to determine housekeeping conditions and identify contamination that has the potential to become airborne.

9. Perform nonroutine smear sampling for items and parts for transfers out of beryllium and regulated beryllium areas.

10. Conduct additional monitoring when warranted due to changes in operations or procedures, or as necessary to support exposure reduction and minimization initiatives.

11. Provide line management with safety and health requirements for working with beryllium on a task-specific basis.

12. Provide the monthly sampling reports prepared by Systems Information Management to line management.

13. Conduct periodic surveillance in conjunction with line management.

14. Serve on operational safety board at the request of line management.

15. Distribute copies of semiannual beryllium trending reports to beryllium area and regulated beryllium area line management.

16. Conduct follow-up investigations on potential occupational illnesses due to work place exposure to beryllium as determined by the Occupational Medicine Services.

C. Line Management

1. Incorporate the CBDPP into the Integrated Safety Management Program.

2. Provide Defense Programs Field Safety and Health Operations with a completed beryllium Hazard Analysis Request when a task involving beryllium or beryllium compounds or a task in a beryllium or regulated beryllium area is required.

3. Review hazard analysis to ensure adequacy and completeness.

4. Notify Defense Programs Field Safety and Health Operations on changes in status (active, inactive, posting, deposting) of beryllium activity, beryllium storage, beryllium, and regulated beryllium areas as required by Section III.

5. Minimize the number of workers at risk and minimize the number of opportunities and time spent in regulated beryllium areas or beryllium areas.

6. Maintain a current list of active beryllium workers. Add employees to the active beryllium worker list by completing the requirements of Appendix I.

7. Maintain a current beryllium augmentation list. Ensure personnel on this list maintain current beryllium training and medical screening. Complete the requirements of Appendix I prior to transferring employees to the active beryllium list.

XIV. RESPONSIBILITIES (cont.)

C. Line Management (cont.)

8. Establish beryllium activity, beryllium storage, beryllium, and regulated beryllium areas consistent with this program.

9. Ensure that BWPs are generated and implemented.

10. Ensure that required change areas or designated change houses are provided.

11. Review semiannual and annual assessment reports and annually establish next year's goals (see Appendix G).

12. Initiate form UCN-20686 when items or parts are to be transferred from a beryllium or regulated beryllium area.

13. Ensure appropriate labeling of equipment, duct work, etc., that has potential internal beryllium contamination (see Section XI).

14. Notify Defense Programs Field Safety and Health Operations when any non-routine smear samples are required.

15. Ensure that permanent and portable HEPA filtered systems designated for beryllium are tested at the appropriate periodicity in accordance with Procedure Y50-35-MD-1904, *High Efficiency Particulate Air Filter Replacement*.

16. Operate in accordance with established waste minimization practices.

17. In conjunction with the Beryllium Program Manager, approve the addition and deletion of beryllium activity, beryllium storage, beryllium, and regulated beryllium areas (see Section III).

18. Provide area specific training for work in beryllium and regulated beryllium areas.

19. Ensure visitors have read the Visitor Information Sheet (Appendix F) and are escorted by authorized personnel while in beryllium activity areas and beryllium storage areas. Ensure properly qualified visitors are escorted while in beryllium areas or regulated beryllium areas.

20. If administrative action levels are exceeded, ensure work is stopped, task is evaluated, and BWP is revised if necessary. Additionally, if OELs are exceeded, ensure critiques are conducted in accordance with Conduct of Operations and Occurrence Reporting requirements.

21. Provide personal sampling results to individual employees.

D. Occupational Medicine Services Director or Designee

NOTE: Occupational Medicine Services beryllium protocol is included in Procedure Y50-59-HS-017, *Requirements for Special Examinations*.

XIV. RESPONSIBILITIES (cont.)

D. Occupational Medicine Services Director or Designee (cont.)

1. Examine all active and former beryllium workers annually. The medical examination shall include pulmonary medical histories, lung function tests, and chest x-rays if warranted. For those former beryllium workers who decline an examination, maintain a signed declination form in the inactive or former beryllium worker's medical file.

b. Maintain beryllium surveillance records in accordance with 29CFR 1910.1020, *Access to Employee Exposure and Medical Records.*

3. Maintain a current roster of former and current workers at risk for CBD.

4. Review the medical records to determine whether workers have disqualifying medical conditions.

5. Obtain informed consent and screen for early detection of CBD using the beryllium specific peripheral blood lymphocyte proliferation testing (LPT), or other available preferred beryllium specific tests to screen for beryllium sensitization and provide early detection of CBD.

   Physicians shall notify workers of the procedures and associated risks of the tests. Any former beryllium worker or employee having had a potential for casual exposure to beryllium will be eligible for the peripheral blood LPT, during the pre-assignment evaluation required for medical approval.

   For those beryllium workers who decline tests, maintain a signed declination form in the worker's medical file.

6. Notify the employee and supervisor of any medical restrictions, in writing, including restrictions from work with beryllium. Employees with medical restrictions for beryllium cannot enter a beryllium activity area, beryllium storage area, beryllium area, or a regulated beryllium area.

7. Provide copies of medical incident reports (MIRs) regarding chronic beryllium disease (see DOE Order 231.1) to Energy Systems Program Development and Data Management, Industrial Safety Reporting and Case Management Group.

8. Notify the Energy Systems Safety and Health Program Development and Data Management, Industrial Safety Reporting and Case Management Group of all diagnosed beryllium related occupational illnesses and medical restrictions, in writing, including restrictions from work with beryllium.

   The MIR shall include workers occupational histories and clinical stages of the disease.

9. Conduct annual analysis and trending of medical surveillance results (i.e., the incidence of CBD and sensitization) and provide to line management and the Beryllium Program Manager.

XIV. RESPONSIBILITIES (cont.)

E. Facilities Management Organization

Perform in-place aerosol challenge testing of HEPA filters in accordance with procedure Y50-35-MD-1904, *High Efficiency Particulate Air Filter Replacement.*

F. Center for Continuing Education

Provide and document general, procedure, and awareness beryllium training.

NOTE: After initial general or awareness beryllium training, proficiency testing may be used to meet biannual update requirements.

G. Installation Occurrence Reporting Manager

Provide line management, Defense Programs Field Safety and Health Operations, Occupational Medicine Services and the Beryllium Program Manager with copies of all beryllium-related occurrence reporting data.

H. Beryllium Worker

1. Minimize potential for exposure in all beryllium operations.

   NOTE: It is good practice to wash hands thoroughly before eating, smoking, or drinking.

2. Adhere to BWP.

3. Report any potential problems to line management when discovered.

d. Submit to a peripheral blood LPT test as part of annual beryllium physical or sign form declining the test.

I. Former Beryllium Worker

Submit to an annual beryllium physical or sign declination form.

J. Employee on the Beryllium Worker Augmentation List

1. Maintain current beryllium training and medical screening.

2. If serving as an emergency responder, notify the organization manager, the Beryllium Program Manager, and Occupational Medicine Services within 48 hours of entry into a beryllium or regulated beryllium area (see Appendix I).

3. Ensure the requirements of Appendix I are met prior to entering beryllium or regulated beryllium areas.

XIV. RESPONSIBILITIES (cont.)

K. Chronic Beryllium Disease Prevention Program Committee

1. Oversee implementation of the CBDPP.

2. Oversee continuing operation of the CBDPP.

3. Review and approve changes to the CBDPP.

XV. DEFINITIONS

BERYLLIUM AND BERYLLIUM COMPOUNDS - Beryllium is a grayish-white metallic substance with an atomic weight of 9.01. It may be in solid or powder form. Beryllium compounds are substances in which beryllium is chemically bound to one or more other elements, e.g., beryllium oxide (BeO). Compounds or alloys will be considered as containing beryllium when present in concentrations of 0.15 percent (1500 ppm) or greater by volume or weight.

BERYLLIUM ACTIVITY AREA - Areas within facilities that encompass beryllium areas, regulated beryllium areas, or beryllium storage areas. Beryllium activity areas are established to alert personnel that the area is restricted because it has active beryllium storage areas or active beryllium processes confined within designated beryllium areas or regulated areas.

BERYLLIUM AREA - A beryllium area is defined as an area where beryllium or beryllium compounds are processed or stored incidental to the process, surface contamination levels are maintained less than 5 ug/100 cm^2, and personal air sampling results are less than 0.5 ug/m^3. See *Chronic Beryllium Disease Prevention Program*, SH-201PD, *Exempted Activities*, Y/SM-13 for exceptions.

BERYLLIUM STORAGE AREA - A beryllium storage area is defined as an area where beryllium or beryllium compounds are stored, surface contamination levels are maintained less than 5 ug/100 cm^2, and personal air sampling results are less than 0.5 ug/m^3.

BERYLLIUM WORK PLAN (BWP) - A permitting document required for beryllium activities conducted in beryllium and regulated beryllium areas. A BWP specifies sampling, facility, training, engineering, administrative, and personal protective equipment requirements.

BERYLLIUM WORKER - An authorized individual whose work assignment requires entry into beryllium or beryllium regulated areas (see Appendix I).

BERYLLIUM WORKER AUGMENTATION LIST - This list contains the names of former beryllium workers or nonberyllium workers that might be needed at short notice to augment the active beryllium worker list. This list serves two functions. Emergency responders that may have to go into beryllium or regulated beryllium areas to fulfill emergency duties will be on this list. Secondly, workers that might be needed to augment the work force to accommodate increased production demands will also be placed on this list. The employees on this list will have completed beryllium general and *Chronic Beryllium Disease Prevention Program*, (SH-201PD) training, be medically screened and ready to be assigned as active beryllium workers when authorized.

CHRONIC BERYLLIUM DISEASE (CBD) - A chronic lung disease caused by immunologic hypersensitivity to beryllium particles, less than 10 microns in diameter.

CHRONIC BERYLLIUM DISEASE PREVENTION PROGRAM COMMITTEE - An executive steering committee comprised of senior line managers, Occupational Medicine Services representatives, safety and health professionals, hourly employees (a union representative and a worker diagnosed with CBD), and DOE representatives. This committee is charged with oversight of the CBDPP.

DOWN POSTING - Downgrade of beryllium areas, beryllium storage areas, or beryllium activity areas to nonberyllium areas; downgrade of beryllium regulated area to beryllium area or nonberyllium area.

XV. DEFINITIONS (cont.)

HAZARD ANALYSIS - A comprehensive assessment completed by a safety and health professional and reviewed by line management for a specific location and task involving beryllium containing products or beryllium contaminated items or weapon components. The hazard analysis includes beryllium use or storage information, recommended controls, operational status, risk ranking, and area designation (see Section IV).

HIGH EFFICIENCY PARTICULATE AIR (HEPA) FILTERS - Filters usually constructed from micro-fine fiberglass which are tested 99.97 percent efficient against a challenge aerosol of 0.3 micron particle size.

ITEMS - An item refers to equipment, tools, instruments, furniture, etc., but excludes weapon components, beryllium materials, and waste.

OCCUPATIONAL EXPOSURE LIMIT (OEL) - The concentration of airborne beryllium which workers are permitted to be exposed on a daily basis. The three types of OELs are:

1. 8-hour time-weighted average (TWA) = 0.002 milligrams/m^3 or 2 micrograms/m^3

2. 30-minute peak limit = 0.025 milligrams/m^3 or 25 micrograms/m^3

3. Ceiling limit = 0.005 milligrams/m^3 or 5 micrograms/m^3

OPERATIONAL SAFETY BOARD (OSB) - A multi-disciplinary team led by the operations manager or designee that includes, at minimum, a task worker and a representative from the Safety and Health Organization. The OSB ensures work activities are within authorization bases, activities are properly planned and authorized, controls are identified and implemented, and the work is being executed safely.

OPERATIONAL STATUS - For purposes of tracking the status of beryllium and regulated beryllium areas, "active" and "inactive" will be used. If an area has ongoing tasks, it is "active." If no tasks are being conducted and all BWPs have been terminated, it is "inactive."

REGULATED BERYLLIUM AREA - A regulated beryllium area is defined as an area where beryllium or beryllium compounds are used and surface contamination is equal to or greater than 5 ug/100 cm^2 or personal air sampling results are equal to or greater than 0.5 ug/m^3.

SITE ADMINISTRATIVE ACTION LEVEL - Site administrative action levels are established as the level at which controls are implemented or actions taken to reduce and minimize exposure. They are established for both surface and airborne concentrations.

VISITOR - A non-Energy Systems employee required to enter a beryllium activity, beryllium, beryllium storage, or regulated beryllium area.

XVI. APPENDICES

A. UCN-20682, *Beryllium Hazard Analysis Request*

B. UCN-20683, *Beryllium Work Plan*

C. UCN-20685, *Beryllium Work Plan Supplemental Sheet*

D. UCN-20684, *Beryllium Work Plan Sign-In Sheet*

E. UCN-20686, *Request for Transfer*

F. Visitor Information Sheet

G. Annual Exposure Reduction and Minimization Assessment Checklist

H. Semiannual Exposure Reduction and Minimization Assessment Checklist

I. Beryllium Worker List Management, UCN-20696, *Beryllium Worker Approval*

NOTE: UCN Forms are located on the Energy Systems Just-in-Time Forms

APPROVED BY: [Approval Signature on File] Date: [4/10/98]
Charlene Edwards, Director
Energy Systems Safety and Health

APPENDIX A
UCN-20682, Hazard Analysis Request
(Page 1 of 1)

LOCKHEED MARTIN ENERGY SYSTEMS | **BERYLLIUM HAZARD ANALYSIS REQUEST**

TO BE COMPLETED BY REQUESTOR

Requestor: Badge: Phone: Date:

Organization: Department:

Task Name:

Projected Start Date: Estimated Duration/End Date:

Job Location: Bldg. Area (Floor) SubArea (Room)

Present Designation: Beryllium Area ☐ Regulated Beryllium Area ☐ Rad Area ☐

Work Description:

Frequency: Daily ☐ Weekly ☐ Monthly ☐ Other ☐ _____

Work regime per 8 hr. shift: Continuous ☐ Noncontinuous ☐ Est. total job length per day (hours): _____

Craft: Workers: Number of employees ☐

Job Supervisor: Name: Badge: Phone:

Previous Beryllium Hazard Analysis Number:

Associated Hazard Analysis and Other Permits:

Submit form to the Organizational Industrial Hygienist

SAFETY & HEALTH ORGANIZATION USE ONLY

Received by: _____ Date: _____ Time: _____

Task Exposure Group:	BWP #	Average Exposure (ug/M^3)	Estimated Exposure (ug/M^3)	Maximum Exposure Potential (ug/M^3)

Assigned Beryllium Hazard Analysis Number:

Comments:

Authorized Derivative Classifier _____ Signature _____ Date

UCN-20682 (2 1-98)

APPENDIX B
UCN-20683, Beryllium Work Plan
(Page 1 of 1)

LOCKHEED MARTIN ENERGY SYSTEMS
BERYLLIUM WORK PLAN

BWP NUMBER ☐ REVISION ☐

ORGANIZATION

BERYLLIUM HAZARD ANALYSIS NUMBER

1. EFFECTIVE

2. EXPIRES

3. EXTENDED TO

4. LOCATION OF WORK — BUILDING | AREA (FLOOR) | SUBAREA (ROOM)

5. AREA DESIGNATION
☐ BERYLLIUM AREA
☐ REGULATED BERYLLIUM AREA

6. DESCRIPTION OF WORK ☐ See Attachment

7. PRE-JOB CONDITIONS ☐ See Attached Survey(s)
☐ BERYLLIUM AREA ☐ OTHER CONCERNS
☐ REGULATED BERYLLIUM AREA

8. CONDITIONS EXPECTED DURING JOB ☐ See Attachment
8 hr TWA ____ ug/M³ ☐ OTHER CONCERNS
Smear level ____ ug/100 cm²

9. REQUIRED SAMPLING

		INITIAL SAMPLING # SAMPLES	ROUTINE SAMPLING # SAMPLES	ROUTINE SAMPLING FREQUENCY
☐ PERSONAL	8 hr TWA			
	30 Minute Peak			
	Ceiling			
☐ AREA				
☐ SMEAR				

10. TRAINING
☐ GENERAL
☐ PROCEDURE
☐ AREA SPECIFIC
☐ VISITOR
☐ CURRENT RESPIRATOR FIT CARD
☐ OTHER _____

11. WORKERS For Regulated Beryllium Areas Only
Name and badge number must be listed for employees entering under this BWP
☐ See Attachment

12. REQUIRED ENGINEERING CONTROLS

13. REQUIRED ADMINISTRATIVE CONTROLS

14. REQUIRED PERSONAL PROTECTIVE EQUIPMENT

Primary Clothing	Gloves	Eye Protection	Shoe Covers	Respiratory Protection	Cartridge Type	Other
☐ Lab Coat	☐ Latex	☐ Safety glasses w/side shields	☐ Required	☐ Half Face	☐ P100	☐
☐ Coverall	☐ Nitrile	☐ Goggles		☐ Full Face	☐ Other (Specify)	
☐ Anti-C's	☐ Neoprene	☐ Face Shield		☐ PAPR		
☐ Tyvek Suit	☐ Leather	☐ Other (Specify)		☐ Supplied Air		☐
☐ Paper Suit	☐ Other (Specify)			☐ SCBA		
☐ Other (Specify)				☐ Other (Specify)		☐

15. FACILITY REQUIREMENTS ☐ Hand Washing ☐ Hand Wipes ☐ Eye Wash ☐ Ventilation ☐ Other

16. SPECIAL INSTRUCTIONS ☐ See Attachment
☐ POST DONNING AND DOFFING INSTRUCTIONS

17. APPROVALS

Position	Signature/ Date	Badge	Position	Signature/Date	Badge
OSB Chairman					
Industrial Hygienist					
Task Employee					
Operations Manager			Authorized Derivative Classifier		

UCN-20683 (2 1-94)

APPENDIX C
UCN-20685, Beryllium Work Plan Supplemental Sheet

LOCKHEED MARTIN ENERGY SYSTEMS BERYLLIUM WORK PLAN	SUPPLEMENTAL SHEET SHEET _____ OF _____	BWP NUMBER REVISION

UNC-20685 (2 1-98)

APPENDIX D
UCN-20684, Beryllium Work Plan Sign In Sheet
(Page 1 of 1)

BERYLLIUM WORK PLAN SIGN-IN SHEET

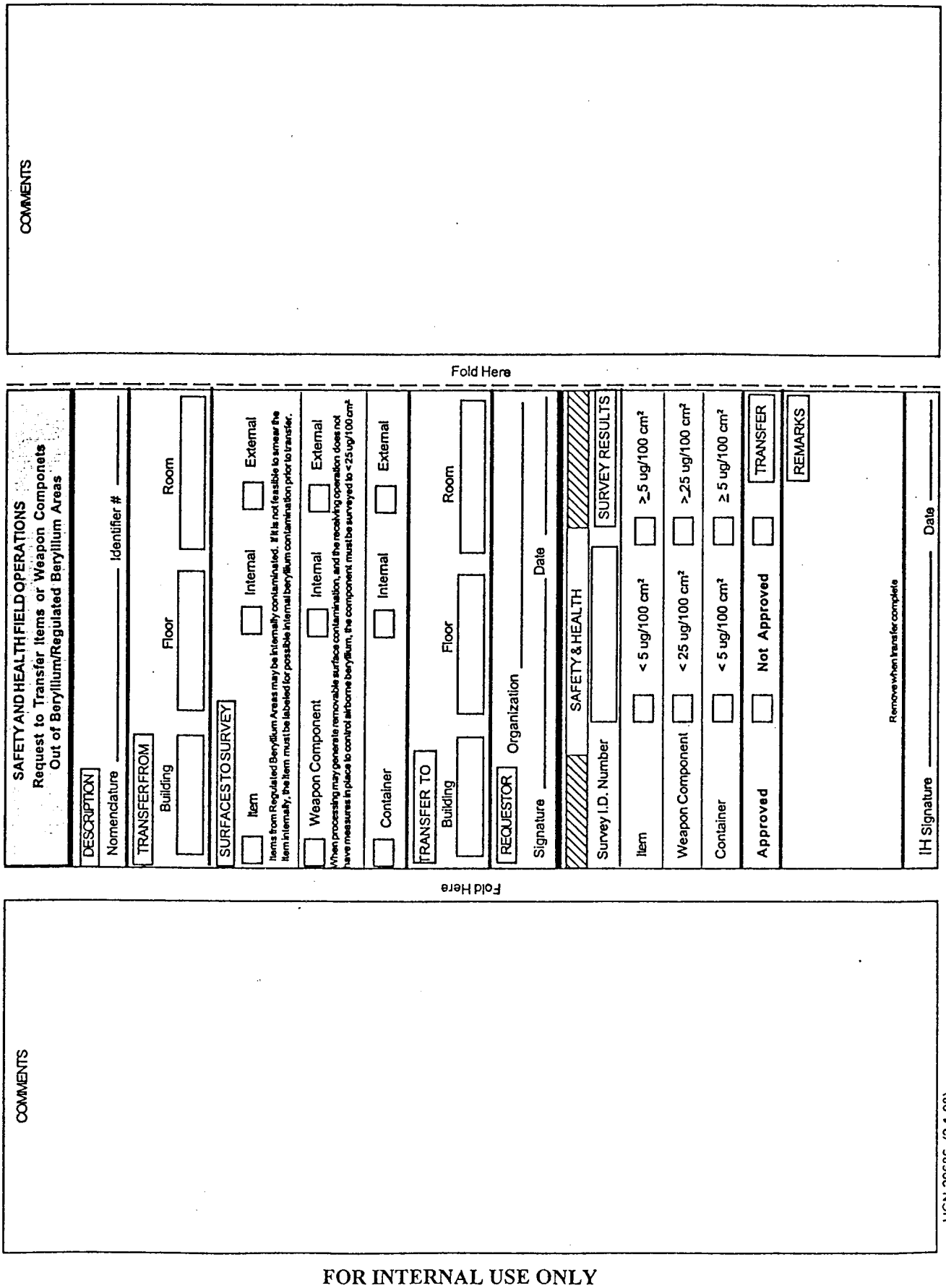
COMPLETION REQUIRED FOR ENTRY INTO A BERYLLIUM OR REGULATED BERYLLIUM AREA

By my signature below I state that I have read, understand, and will comply with all requirements specificed in the Beryllium Work Plan (BWP) indicated.
Employees wearing a personal breathing zone monitor must also complete the PUMP ON / PUMP OFF times.

						DATE	TOTAL TIME
NAME	BADGE NUMBER	TIME IN	TIME OUT	TIME IN	TIME OUT		
SIGNATURE	BWP NUMBER	PUMP ON	PUMP OFF	PUMP ON	PUMP OFF		MINUTES
NAME	BADGE NUMBER	TIME IN	TIME OUT	TIME IN	TIME OUT		
SIGNATURE	BWP NUMBER	PUMP ON	PUMP OFF	PUMP ON	PUMP OFF		MINUTES
NAME	BADGE NUMBER	TIME IN	TIME OUT	TIME IN	TIME OUT		
SIGNATURE	BWP NUMBER	PUMP ON	PUMP OFF	PUMP ON	PUMP OFF		MINUTES
NAME	BADGE NUMBER	TIME IN	TIME OUT	TIME IN	TIME OUT		
SIGNATURE	BWP NUMBER	PUMP ON	PUMP OFF	PUMP ON	PUMP OFF		MINUTES
NAME	BADGE NUMBER	TIME IN	TIME OUT	TIME IN	TIME OUT		
SIGNATURE	BWP NUMBER	PUMP ON	PUMP OFF	PUMP ON	PUMP OFF		MINUTES
NAME	BADGE NUMBER	TIME IN	TIME OUT	TIME IN	TIME OUT		
SIGNATURE	BWP NUMBER	PUMP ON	PUMP OFF	PUMP ON	PUMP OFF		MINUTES

UCN-20684 (2 1-98)

APPENDIX E
UCN-20686, Request for Transfer
(Page 1 of 1)



APPENDIX F
Visitor Information Sheet
(Page 1 of 1)

AREA VISITOR: BERYLLIUM INFORMATION SHEET

The area you are preparing to enter processes or stores beryllium or encompasses one of these areas. You may enter a beryllium activity or beryllium storage area after reading this information sheet and with an authorized escort. You must have general beryllium training and be in a beryllium medical surveillance program before you can enter a beryllium or beryllium regulated area.

Beryllium is a light weight metal with special properties. It may be in solid or powder form or in a compound such as beryllium oxide (BeO).

In abrasive type operations, beryllium particles are released and can become airborne. When these airborne particles are at a certain concentration and are inhaled they may cause health problems for a limited percentage of the population. In susceptible people, an allergic reaction occurs and from that point on they are "sensitive" to beryllium. When concentrations are great enough or the frequency of exposure is excessive, the person can develop Chronic Beryllium Disease (CBD). This disease occurs when small particles go deep into the lung, are deposited there, and form granulomas. The granulomas can cause a restriction in the bodies ability to get the normal amount of oxygen.

A program to manage and control exposures to beryllium has been implemented in Lockheed Martin Energy Systems facilities. This is being accomplished by reducing airborne levels of beryllium, minimizing the number of workers potentially exposed to beryllium, minimizing the number of opportunities to be exposed, and setting reasonable exposure reduction goals.

At your request, more safety and health related aspects of the beryllium operation in this area will be explained by line management or the safety and health staff. Related aspects of interest may include the following:

Beryllium Work Plan (BWP)
Hazard analysis reports on file for each task conducted in the area
Exposure potential for the different tasks in the area
Engineering controls used in the area
Personal protective equipment required
Locations where possible beryllium releases could occur and the awareness of how to detect such releases
Material Safety Data Sheets on file
Historical sampling reports or trend reports on breathing zone, area, and smear sampling

Additional information on the Energy Systems Beryllium Protection Program may be obtained from the command media SH-201PD.

APPENDIX G
Annual Exposure Reduction and Minimization Assessment Checklist
(Page 1 of 1)

1. Program manager gather the following reports and information:

    a) Annual exposure reduction goals
    b) Monthly personal sampling reports
    c) Monthly reports by location on area sampling, smear sampling, and permanent air sampling
    d) Semiannual correlation and trending on working conditions and health outcomes
    e) Semiannual trending report on task exposure group personal monitoring, area samples, permanent air samples, and smear samples
    f) Investigation results of any personal samples exceeding administrative action levels
    g) Beryllium-related occupational illnesses and medical restrictions
    h) Annual medical surveillance assessment analysis and results and exposure monitoring by risk factor
    i) Semiannual reports (Appendix H)
    j) Facility baseline inventories

2. Compare annual exposure reduction goals to actual exposure results for the last six months.

    a) Have the number of workers at risk been minimized?
    b) Have the number of exposure opportunities been minimized?
    c) Have any new beryllium workers been added to the list during this period? Why?
    d) Has the time spent in beryllium or beryllium regulated areas been minimized?
    e) Validate plant baseline inventory. Have any new beryllium or beryllium regulated areas been established during this period? Why?
    f) Have goals for total exposure, occurrences, and exceeding administrative action levels been achieved? If not, Why?
    g) Were exposure mitigation recommendations and strategies effective?

3. Recommend modifications to the established beryllium controls based on the results of the analysis above.

4. Recommend revised exposure reduction and minimization goals for the following for the next annual cycle:

    a) Expected exposure levels
    b) Number of workers at risk
    c) Frequency and time spent in beryllium work areas
    d) Applicability of control options
    e) Number of occurrences and exposures exceeding administrative limits

5. Evaluate and recommend changes to either general or job specific training based on the results.

6. Operational safety board review data and results, and modify recommendations as appropriate, then forward to the appropriate line manager for approval.

7. Appropriate line manager review results and approve recommendations and new annual goals.

8. Appropriate line manager implement appropriate recommendations from the report and promulgate new annual goals.

APPENDIX H
Semiannual Exposure Reduction and Minimization Assessment Checklist
(Page 1 of 1)

8. Program manager gather the following reports and information:

    f) Annual exposure reduction goals
    b) Monthly personal sampling reports
    c) Monthly reports by location on area sampling, smear sampling, and permanent air sampling
    d) Semiannual correlation and trending on working conditions and health outcomes
    e) Semiannual trending report on task exposure group personal monitoring, area samples, permanent air samples, and smear samples
    f) Investigation results of any personal samples exceeding administrative action levels

9. Compare annual exposure reduction goals to actual exposure results for the last six months.

    a) Have the number of workers at risk been minimized?
    b) Have the number of exposure opportunities been minimized?
    c) Have any new beryllium workers been added to the list during this period? Why?
    d) Has the time spent in beryllium or beryllium regulated areas been minimized?
    e) Have any new beryllium or beryllium regulated areas been established during this period?
    f) Have goals for total exposure, occurrences, and exceeding administrative action levels been achieved? If not, why?
    g) Were exposure mitigation recommendations and strategies effective?

10. Recommend modifications to the established beryllium controls based on the results of the analysis above.

4. Evaluate and recommend changes to either general or job specific training based on the results.

5. Operational safety board review data and results, and modify recommendations as appropriate, then forward to the appropriate line manager for approval.

6. Appropriate line manager review results, approve recommendations, and implement.

APPENDIX I
Beryllium Worker List Management
Page 1 of 3

The form UCN-20696, *Beryllium Worker Approval*, is used to process and document approval for additions to the Active Beryllium Worker List data base maintained by Occupational Medicine Services. The completed forms are retained by the operations manager (or equivalent) making the request. Additions to the beryllium worker augmentation list do not require completion of this form.

Active, Former, and Potential Beryllium Worker Data Base:

1. The data base of active, former, and nonberyllium workers on the augmentation list is maintained by Occupational Medicine Services.

2. There are three lists:

   a) Active Beryllium Worker List. This list contains the names of personnel that have been approved by the appropriate organization manager, successfully completed medical screening for the program, and have been authorized by Occupational Medicine Services to perform tasks assigned to beryllium workers. It is incumbent upon each organization to ensure each active worker's training is current before assigning them to perform tasks that require entry into beryllium or regulated beryllium areas.

   b) Former Beryllium Worker List. When active beryllium workers are no longer required or medically qualified to perform tasks in beryllium or beryllium regulated areas, their names are transferred to the Former Beryllium Worker List. Former beryllium workers continue to be medically screened in accordance with Occupational Medicine Services procedures. Where possible, former workers on this list can be shifted back to the active list and assigned to beryllium related tasks.

   c) Beryllium Worker Augmentation List. This list contains the names of former beryllium workers or nonberyllium workers that might be needed at short notice to augment the active beryllium worker list. This list serves two functions. Emergency responders that may have to go into beryllium or regulated beryllium areas to fulfill emergency duties will be on this list. Secondly, workers who might be needed to augment the work force to accommodate increased production demands will also be placed on this list. The employees on this list will have completed beryllium general and *Chronic Beryllium Disease Prevention Program* (SH-201PD) training, be medically screened, and ready to be assigned as active beryllium workers when authorized.

Making Additions to The Active Beryllium Worker List:

1. By filling out the upper section of the Beryllium Worker Approval form, the appropriate line manager (operations manager or equivalent) identifies to the Beryllium Program Manager prospective additions to the Active Beryllium List, rationale for addition request including medical and training status, whether the employee is on the augmentation list or a former beryllium worker, and the date that the employee is needed to perform beryllium related work.

2. The Beryllium Program Manager completes his section of the form and forwards it to the organization manager.

APPENDIX I
Beryllium Worker List Management
Page 2 of 3

3. If the organization manager approves the request, he forwards the form to Occupational Medicine Services who completes medical screening requirements and medically authorizes the employee by adding his name to the active list. Occupational Medicine Services then returns the completed form to the requesting line manager for retention.

4. If the Beryllium Program Manger does not approve the request, the organization manager can take the request to the CBDPP Committee for resolution.

5. If the organization manager disapproves the request, he returns the form to the requesting line manager.

6. Emergency responders are considered authorized when required to enter a beryllium or regulated beryllium area in order to carry out their emergency duties. The organization manager, Beryllium Program Manager and Occupational Medicine Services must be informed within 48 hours of the entry. Occupational Medicine Services will then shift the emergency responder to the active list.

Removal of Employees From The Active Beryllium Worker or Beryllium Worker Augmentation List:

1. Personnel will be removed from the active or augmentation list by Occupational Medicine Services upon the request of the employee or appropriate line manager.

2. If the employee was an active beryllium worker, his name will automatically be transferred to the Former Beryllium Worker List in accordance with Occupational Medicine Services procedures.

APPENDIX I
Beryllium Worker List Management
Page 3 of 3

UCN-20696, Beryllium Worker Approval

LOCKHEED MARTIN ENERGY SYSTEMS	BERYLLIUM WORKER APPROVAL

OPERATIONS MANAGER

Requestor: Badge: Phone: Date:

Organization: Department:

It is requested that the following employee be added to the Beryllium Worker List.

Name _____ Badge # _____ Craft _____

☐ New Beryllium Worker
☐ Augmented List
☐ Former Beryllium Worker

Current
☐ General Training
☐ Procedure Training
☐ Area Specific Training
☐ Medical/approval

Beryllium Work Plans Utilized:

The above worker will work under the following BWP number (s)

BWP Number				
Number in craft working BWP	☐	☐	☐	☐

Reason for Addition to Beryllium Workers List:

☐ Replacement worker ☐ Additional worker needed on current task ☐ Worker needed on new task

Date Employee Required for Work: / /

Justification -

Signature _____ Date _____

BERYLLIUM PROGRAM MANAGER

☐ Approved ☐ Not Approved ☐ Inadequate Information

Comments:

Signature _____ Date _____

ORGANIZATION MANAGER

☐ Approved ☐ Not Approved ☐ Inadequate Information

Comments:

Signature _____ Date _____

MEDICAL DIRECTOR

☐ Approved ☐ Not Approved ☐ Inadequate Information

Comments:

Signature _____ Date _____

UCN-20696 (2 2-98) Return Original to Operations Manager